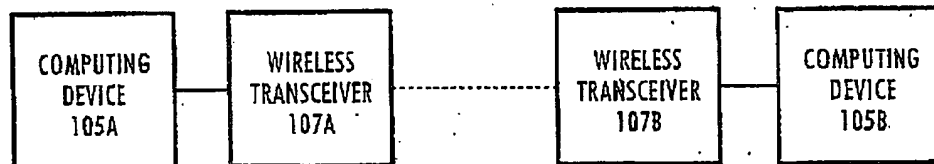TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
.INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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COMPUTING DEVICE 105A — WIRELESS TRANSCEIVER 107A ------ WIRELESS TRANSCEIVER 107B — COMPUTING DEVICE 105B

FIG. 1

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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FIG. 2

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FIG. 3

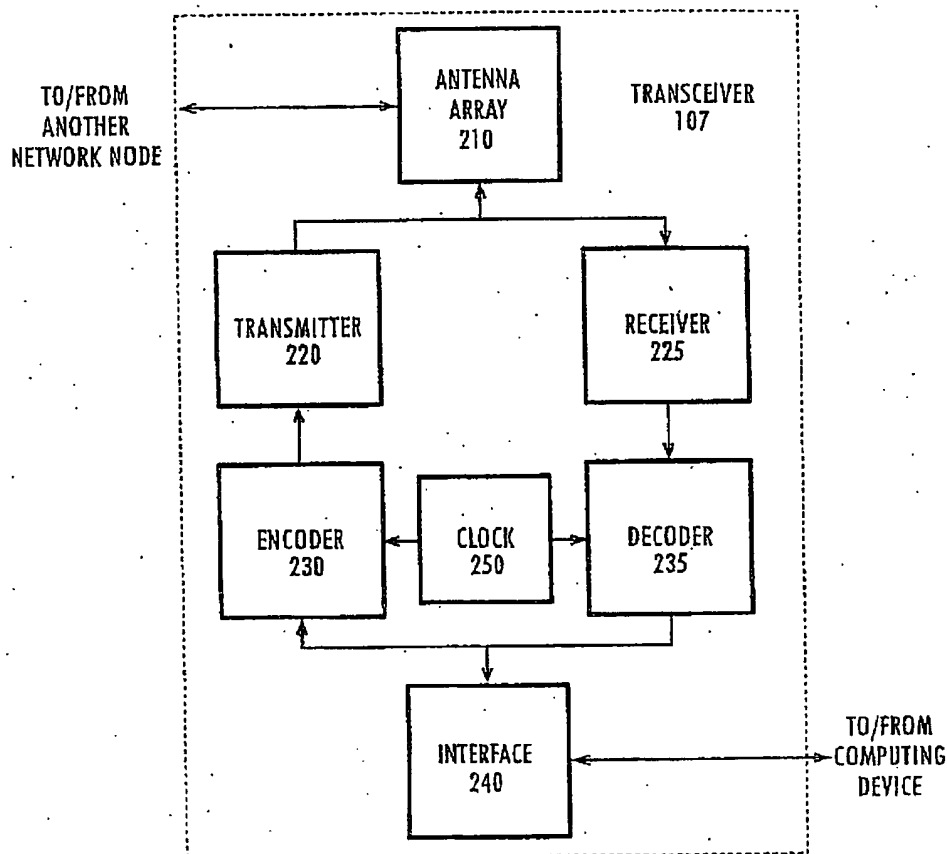
FIG. 4

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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TO
TRANSMITTER
220

ANTENNA
CONTROL
SIGNAL

ENCODER
230

FREQUENCY
CONTROL
SIGNAL

TRANSMIT
PHY
520

FROM
CLOCK
250

TRANSMIT
MAC
510

FROM
INTERFACE
240

FIG. 5A

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
.INVENTOR(S): John B. Langley
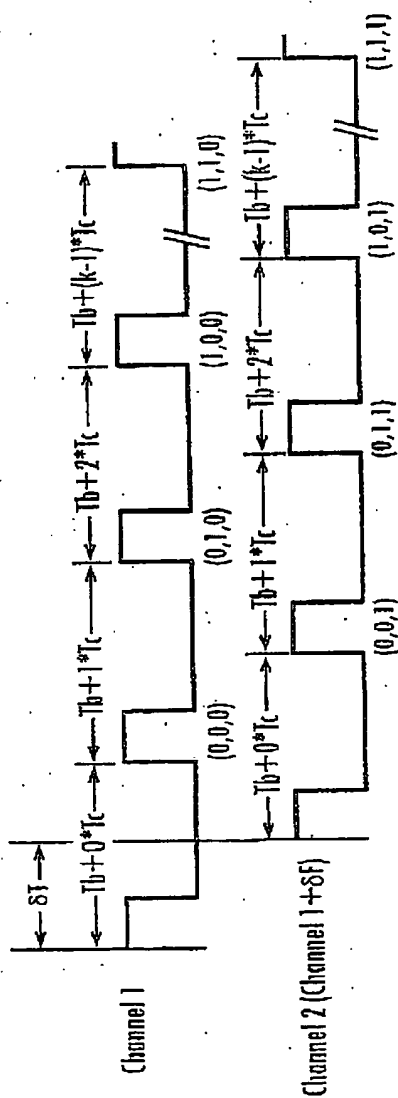ATTORNEY DOCKET NO.: 012.P6002
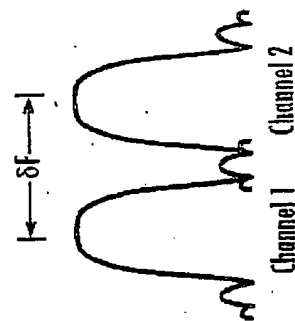
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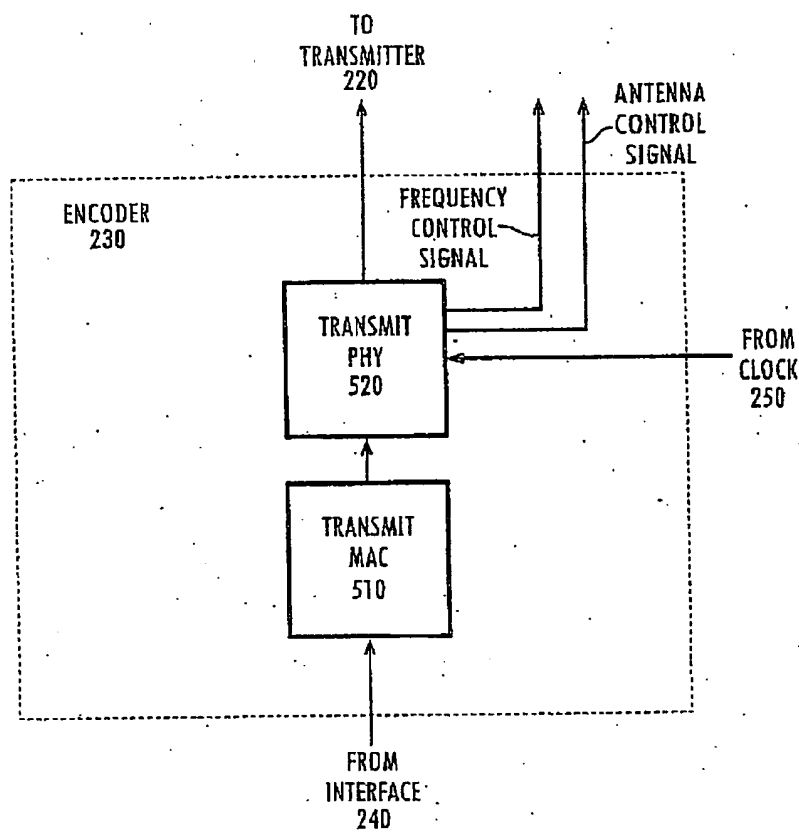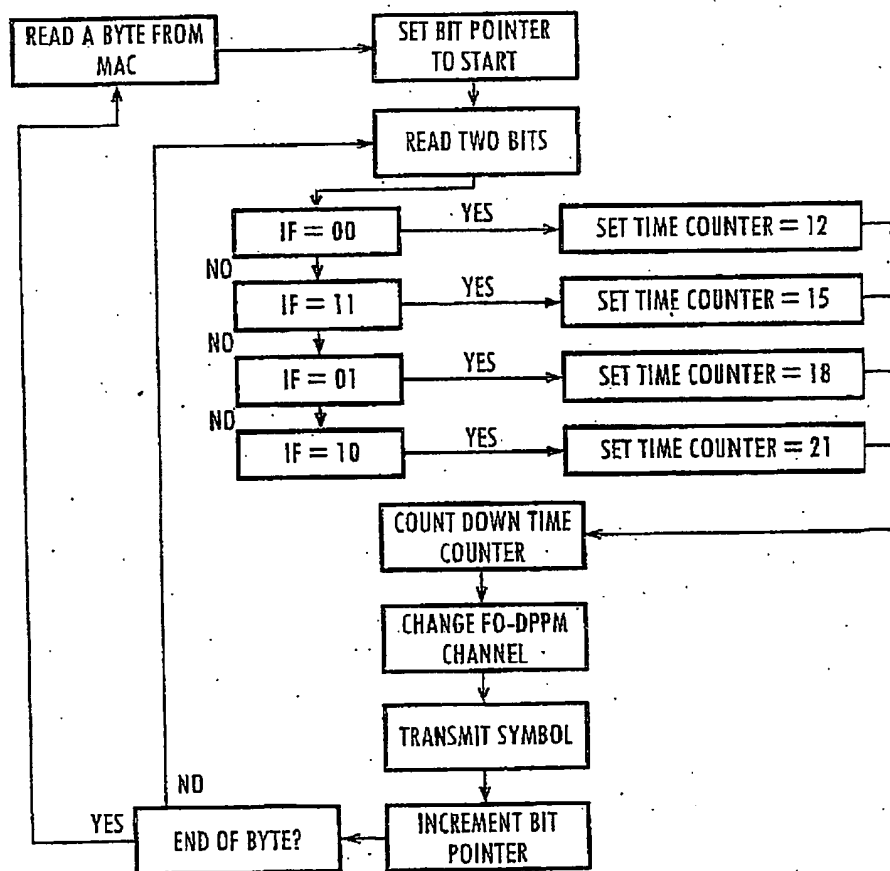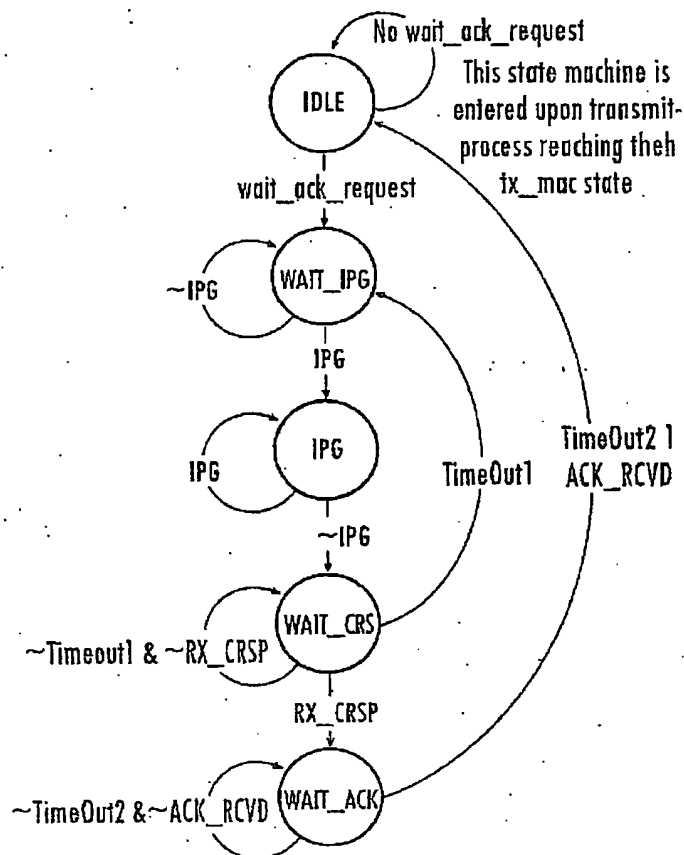FIG. 5B

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
.INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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Request/events assertion to transmit state machine in the order of priority:
- sx_idle: AIR is idle and ready for access by all nodes
- ack_req: request for acknowledge transmission from the rx_mac
- tx_req: packet is queued for transmission

Wait 10 us (TimeOut) in this state for rx_idle to get asserted, otherwise Do not send the ack-packet since another node has violated the IPG

~TimeOut & ~rx_idle

TX_ACK_WAIT

ack-req

IDLE

ack_req. preserve the tx_state

~ack-req]~tx_req]~rx_idle

TimeOut & ~restore_state

tx_req

RD_HDR   ~rx_idle   NW_BUSY   ~rx_idle

TimeOut & restore_state
~Timeout & ex_idle

rx_idle & ~ack_req

rx_idle

defer

TX_RDY   late_tx_bk_off   TX_DEFER   defer_cnt_done

rx_idle

ack-req. preserve tx_state

rt_idle & ~defer)
i ack_packet

defer_cnt_done
& rx_idle

~restore tx_state

TX_PAMBL

Backoff_done & ~ack-req

ack_packet was sent and needs to restore tx_stage

TX_SFD

ack_packet

Maximum defereral count is reached

~ack_packet_done   TX_D   TX_D   ~payload_done

~backoff_done
& ~ack-req   TX_BKOFF

payload_done

ack_packet_done

TX_CRS   TXCRS_CFF

Maximum Retransmit is not reached

broadcast & 1st-pass

TX_CRC

ack-packet & 1st pass

~ack_packet & ~broadcast & NeedAck

TX-COLL

WAIT_ACK

KickOff
wait_for_ack state machine

Exit from the wait-for-ack state machine
Maximum retransmit is reached

ACK_RCVD

TX-DONE

FIG. 5C

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
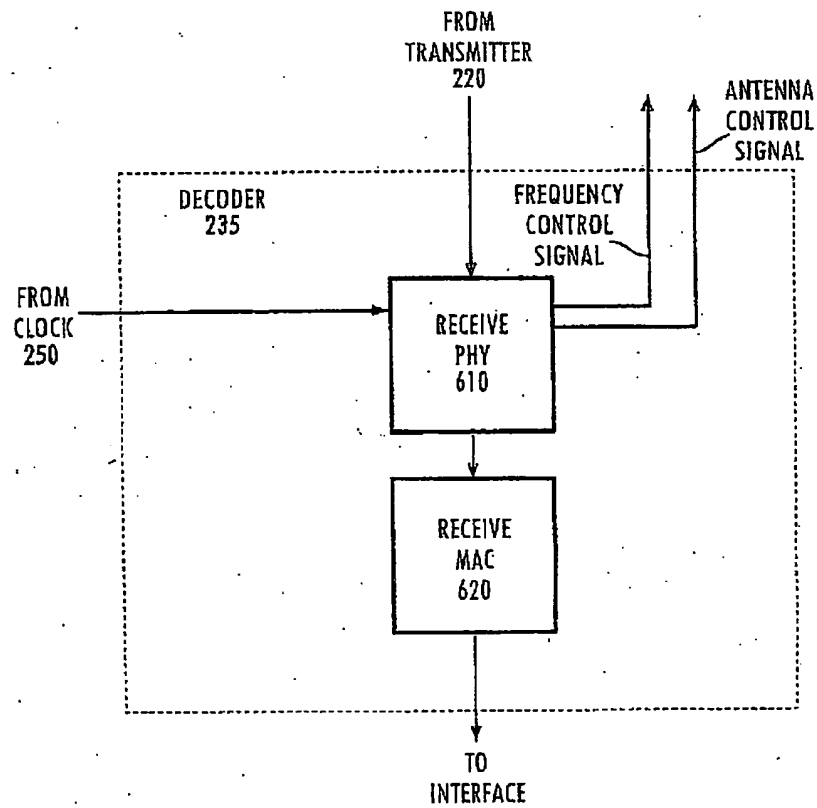ATTORNEY DOCKET NO.: 012.P6002

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TimeOUt1, Programmable parameter ACK_WAIT_SIZE:
6, 12, 18, 24, 36, 48, 72, 90 US
TimeOut2, fixed size: 37.125 us which is the maximum length of an
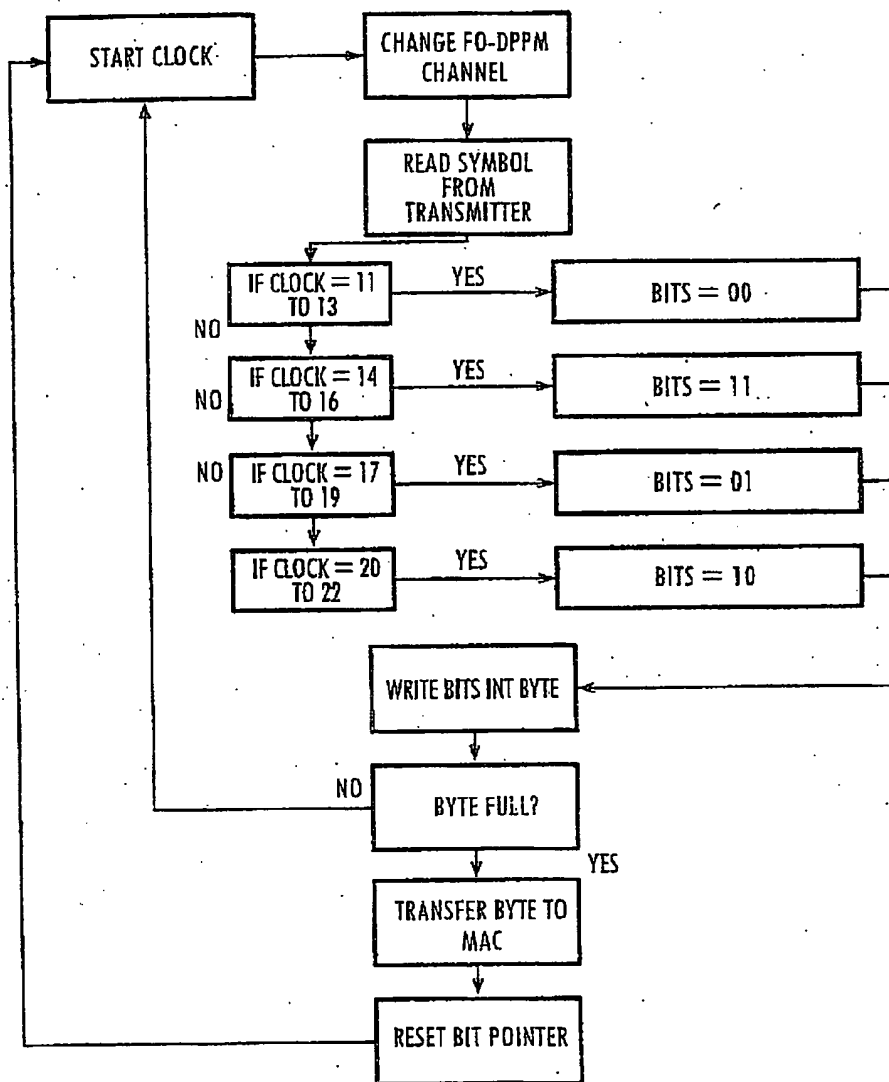acknowledge packet (24 preamble + sfd + 20 byte ack_packet)

FIG. 5D

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
.INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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FROM
TRANSMITTER
220

ANTENNA
CONTROL
SIGNAL

DECODER
235

FREQUENCY
CONTROL
SIGNAL

FROM
CLOCK
250

RECEIVE
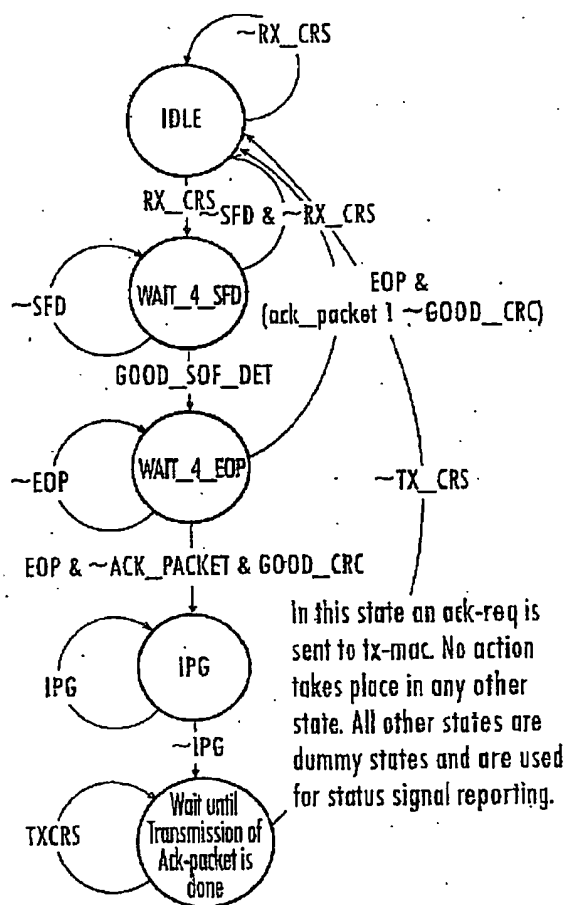PHY
610

RECEIVE
MAC
620

TO
INTERFACE

FIG. 6A

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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FIG. 6B

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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FIG. 6C

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
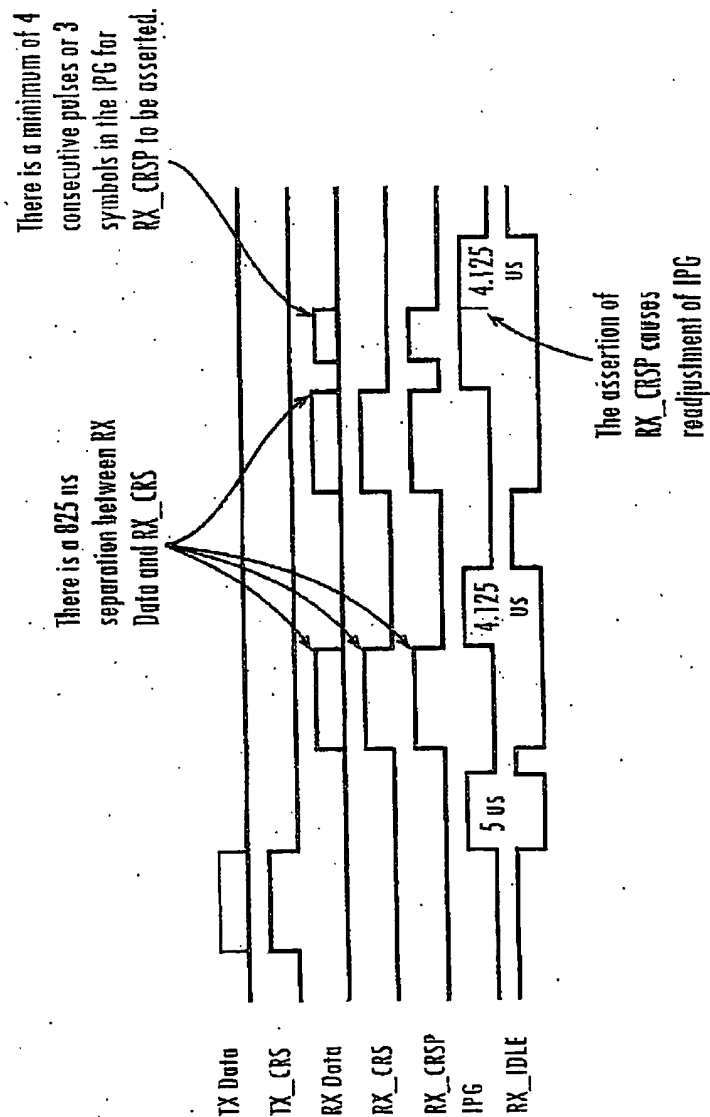ATTORNEY DOCKET NO.: 012.P6002

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FIG. 6D

TITLE:FREQUENCY OFFSET DIFFERENTIAL PULSE POSITION MODULATION
INVENTOR(S): John B. Langley
ATTORNEY DOCKET NO.: 012.P6002

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For preamble the following sequence is
received: 00, 11, 01, 10 and the state
machine tries to lock on this sequence.
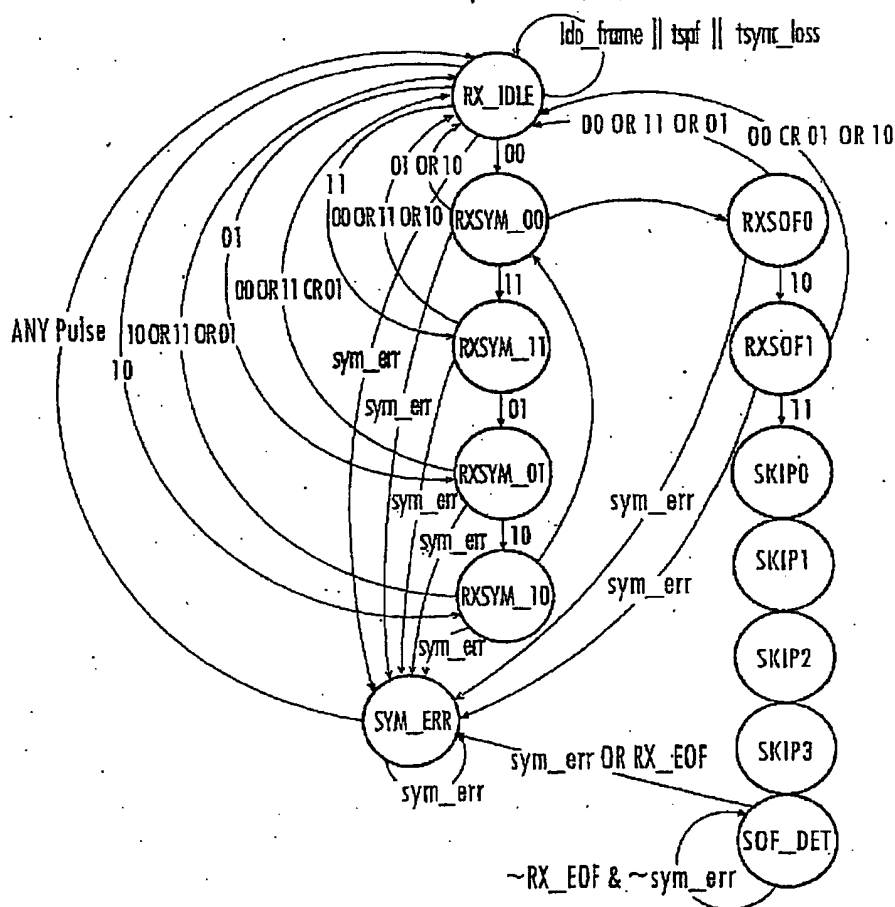For SFD the sequence is 00, 00, 01, 11

FIG. 6E